IN THE CLAIMS:

Claims 5, 6, 9, 10, 11, 12, 14, 16, 17, 18, 19, 20, 22, 23, and 25 have been amended. Claims 1-4 and 7-8 are cancelled without prejudice. All of the pending claims are presented below. This listing of claims will replace all prior versions and listings of claims in the application. Please enter these claims as amended. New claims ____ have been added.

1. (cancelled)

2. (cancelled)

3. (cancelled)

4. (cancelled)

5. (currently amended) A biosensor, comprising a resonant optical cavity ~~The biosensor of claim 1, where said resonant optical cavity has~~ having a quality factor of at least about $10^4$.

6. (currently amended) A biosensor, comprising a resonant optical cavity ~~The biosensor of claim 1, where said resonant optical cavity has~~ having a quality factor of at least about $10^7$.

7. (cancelled)

8. (cancelled)

9. (currently amended) A biosensor, comprising a resonant optical cavity having a substantially planar surface, said resonant optical cavity being cylindrical in shape and having a diameter of about 10 $\mu$m to about 100 $\mu$m ~~The biosensor of claim 7,~~ said biosensor further comprising an array of resonant optical cavities.

10. (currently amended) The biosensor of ~~claim 1~~ claim 5, further comprising a transmission port adjacent a surface of said resonant optical cavity and configured to transmit electromagnetic radiation into said resonant optical cavity.

11. (currently amended) A biosensor comprising a resonant cavity having a transmission port adjacent a surface of said resonant optical cavity and configured to transmit electromagnetic radiation into said resonant optical cavity ~~The biosensor of claim 10~~ wherein said transmission port comprises a waveguide distribution network configured to transmit electromagnetic radiation into a plurality of resonant optical cavities, said waveguide distribution network including at least one of a bus network and a combination tree-bus network.

12. (currently amended) The biosensor of ~~claim 1~~ claim 5, further comprising at least one capture substrate immobilized on or adjacent to a surface of said resonant optical cavity.

13. (original) The biosensor of claim 12, comprising a plurality of types of capture substrates immobilized on or adjacent to said surface.

14. (currently amended) The biosensor of claim 13, wherein said plurality of types of capture substrates are immobilized on or adjacent to different regions of said ~~surface1~~ surface.

15. (original) The biosensor of claim 12, further comprising a sensor configured to detect binding of said at least one capture substrate with analyte or a molecule that competes with said analyte.

16. (currently amended) The biosensor of ~~claim 15~~ claim 12, ~~wherein said~~ further comprising a sensor ~~is configured to detect~~ for detecting at least one of mass and fluorescence.

17. (currently amended) A biosensor, comprising a resonant optical cavity, ~~The biosensor of claim 1, wherein~~ said resonant optical cavity ~~is~~ being doubly resonant.

18. (currently amended) A biosensor, comprising a resonant optical cavity, ~~The biosensor of claim 1, wherein~~ said resonant optical cavity ~~is~~ being capable of generating whispering gallery modes and ~~comprises~~ comprising at least one of a microfabricated resonant optical cavity and a bulk resonant optical cavity ~~further~~, and further comprising:

a source of electromagnetic radiation;

a transmission port in communication with said source and disposed adjacent a surface of said resonant optical cavity so as to transmit electromagnetic radiation into said resonant optical cavity;

at least one capture substrate immobilized on or adjacent to a substantially defect free surface of said resonant optical cavity; and

a sensor configured to detect at least one of a mass of molecules immobilized relative to said surface and fluorescence from molecules immobilized relative to said surface.

19. (currently amended) A method for detecting at least one analyte in a sample, comprising:

applying the sample to a surface of a resonant optical cavity having a quality factor of at least about $10^4$ so as to expose at least one capture substrate immobilized relative to said surface to the at least one analyte;

introducing electromagnetic radiation into said resonant optical cavity; and

detecting binding of the at least one analyte to said at least one capture substrate.

20. (currently amended) A method for detecting at least one analyte in a sample, comprising:

applying the sample to a surface of a resonant optical cavity so as to expose at least one capture substrate immobilized relative to said surface to the at least one analyte;

introducing electromagnetic radiation into said resonant optical cavity; and

detecting binding of the at least one analyte to said at least one capture substrate,~~The method of claim 19,~~ wherein said applying comprises applying to said surface at least one of a fluorescently labeled analyte and a fluorescently labeled molecule that competes with the at least one analyte for a binding site on said at least one capture substrate.

21. (original) The method of claim 20, wherein said detecting comprises detecting excitation of fluorescent tags by employing at least one of one-photon absorption and two-photon absorption.

22. (currently amended)A method for detecting at least one analyte in a sample, comprising:

applying the sample to a surface of a resonant optical cavity so as to expose at least one capture substrate immobilized relative to said surface to the at least one analyte;

introducing electromagnetic radiation into said resonant optical cavity; and

detecting binding of the at least one analyte to said at least one capture substrate, ~~The method of claim 19,~~ further comprising photo-recycling said electromagnetic radiation by double resonance of said resonant optical cavity.

23. (currently amended) A method for detecting at least one analyte in a sample, comprising:

applying the sample to a surface of a resonant optical cavity so as to expose at least one capture substrate immobilized relative to said surface to the at least one analyte;

introducing electromagnetic radiation into said resonant optical cavity; and

detecting binding of the at least one analyte to said at least one capture substrate, ~~The method of claim 19,~~ wherein said detecting comprises mass sensing.

24. (original) The method of claim 23, wherein said mass sensing comprises measuring a refractive index through cavity detuning.

25. (currently amended A method for detecting at least one analyte in a sample, comprising:

applying the sample to a surface of a resonant optical cavity so as to expose at least one capture substrate immobilized relative to said surface to the at least one analyte;

introducing electromagnetic radiation into said resonant optical cavity; and

detecting binding of the at least one analyte to said at least one capture substrate, ~~The method of claim 19,~~ wherein said detecting is effected with a concentration of the at least one analyte being at least one of nanomolar or lower and picomolar or lower.

26. (original) A method for fabricating a resonant optical cavity, comprising:

providing a substrate;

fabricating a contrasting layer on said substrate; and

forming a resonant optical cavity over said contrasting layer, said resonant optical cavity having a refractive index of at least about 1.5 times a refractive index of said contrasting layer.

27. (original) The method of claim 26, wherein said providing said substrate comprises providing at least one of glass, quartz, and a semiconductive material.

28. (original) The method of claim 26, wherein said forming said resonant optical cavity comprises:

forming a material layer comprising at least one of silicon oxide and silicon oxynitride over said contrasting layer; and

patterning said material layer to form at least one cylindrical resonant optical cavity therefrom.

29. (withdrawn) A method for fabricating a resonant optical cavity, comprising:

providing a bulk cylindrical substrate comprising at least one of glass and quartz;

polishing an end of said bulk cylindrical substrate; and

forming an ion-exchange waveguide at said polished end.

30. (withdrawn) The method of claim 29, wherein said forming comprises implanting said polished end with at least one of sodium ions and potassium ions.